FROM HEP TO PET/CT

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The use of multi-modality imaging to stage patients with cancer has now become standard practice. The benefits of assessing disease processes with combined imaging modalities is widely recognized and extensively documented. Such instrumentation for molecular imaging is also finding a role in designing appropriate therapies for individual patients and for monitoring their response to personalized treatment. However, the appearance in the clinic of purpose-specific multi-modality instrumentation is relatively recent and the demand to improve spatial resolution and sensitivity at increasingly lower radiation dose is a challenge that requires innovative hardware and software methodology. Such improvements must be achieved within the constraints imposed by cost and clinical acceptability. The current trend in PET instrumentation is in the direction of compact, magnetic field-insensitive detectors that are common to both PET/CT and the more-recently introduced PET/MR scanners. Many of the developments in medical imaging that will be highlighted are consequences of technology originating from the High Energy Physics (HEP) community. This presentation will discuss the various technological milestones that have been attained over the past several decades and assess the extent to which they offer a future direction for multi-modality instrumentation.